Practical Approaches to Strip Mall Fires:
With a Concentration on Rural/Low Manpower Operations

CONTENTS

Introduction

When I was approached to write this text I react with a mix of trepidation and joy. I was scared to look like an idiot but happy to have a chance to share all I have had the chance to learn. I have been lucky over the course of my career as a paid firefighter and a volunteer to work with some great people. Some were better with the theory and others could barely spell their own name but could put the fire truck exactly where it needed to be at every single time.

I learned my lessons the hard way. I went to fires and messed up. I have taken the wrong line to the right place and have taken the right line to the wrong place. I have taken the long solitary ride home in the fire chief's car listening to how bad I messed up. The lesson I took away from these years of trial and error is that no matter how well I do on a fire I always could have done better. Maybe this discussion can save you a few trips to see the Chief.

Long ago I became a harsher critic of my own actions than any outside observer could ever be. There is no other way to exist in the fire business. This book is my chance to share the lessons I have learned with anyone willing to listen. My approach is to show you what I know will work and to skip the things that I am not so sure of. This book is about getting the job done at strip mall fires without all the resources of the big city fire departments. Everything here will work with a three-person engine crew, and if it might not I am sure to say so.

About one week into this project humility set in. As I tried to put everything I know on paper it became increasingly clear that there was much more to know. Of course I could not wait until I knew everything; that would take a while. At no point do I claim to be an expert. I am merely sharing what I know. I also include a list of additional resources because the only expert out there is all of the good minds combined.

This discussion only covers strip mall fires and surely that is enough for one day. Enough of the chatter; let's see what there is to know about fires in strip malls.

Building Construction Overview

For the purposes of this discussion the term strip mall refers to any of the numerous styles of commercial shopping centers arranged in a row with a common awning and sidewalk. These structures come in many forms and the actual design depends on numerous factors including the area where they are built and the year they were built. When we discuss strip malls we differentiate them from the taxpayer because the strip mall is not designed for residential occupancy. We differentiate the strip mall from the stand-alone store of similar construction because the stand-alone store does not present the same exposure problems and is thusly a different animal.

Strip malls come in many shapes and sizes but it is the things they have in common that allow for a unique approach to fires in these structures to be developed. The discussion below is a brief overview of general building construction features. However, each company who might be call to a strip mall fire should take the time to learn the buildings in their area. Area familiarization is a life saving tool.

Overview

Considerable variations in construction features exist when it comes to the strip mall but the picture on the left paints one of the more common pictures. The picture shows the lightweight steel construction common to these structures.

Most strip malls are block with the block walls holding up lightweight steel trusses. The individual occupancies tend to be narrow in the front and deep. However, as the picture indicates you can find steel super structures with lightweight truss assemblies for the roof. Or, as the picture below indicates, you can find a steel structure formed on top of a concrete pad without block support. However, this tends to be found more often in stand-alone structures.

The roof structure is usually lightweight steel bar joist or metal deck roof. In some cases only a thin single thickness of corrugated metal covers the bar joists and forming the roof deck. On the front of the building it is typical to find a parapet wall, typically designed as an aesthetic measure. The parapet covers the unsightly and extremely dangerous roof-top HVAC units. While the load of the HVAC unit, along with snow and rain loads is factored into the engineering of the building, engineering does not account for the HVAC support structure to be attacked and weakened by fire.

Parapet walls make gaining roof access from the front dangerous and difficult if not reckless and impossible. Peaked parapet walls in the front may be held up by a cable system anchored to the roof. The presence of a parapet wall also increases the radius of the collapse zone considerably. While parapet walls are less common in the rear they do exist. One easy way to detect parapets in the rear is by the location of the roof drains. If there is wall above the gutter drain then a parapet is present.

Strip malls are usually one tall story in the front and one regular story in the back but don't immediately rule out the possibility of a second floor. When present the second floor tends to be used as office space and usually has hidden access. This differs from the tax-payer, which has a commercial space on the first floor and a residential occupancy on the second floor. When sizing-up these structures remember that the actual occupancy does not always reflect the intended use. Do not be surprised to find illegal living quarters.

In newer buildings cost savings are achieved, time is saved, and aesthetics unaffected by leaving the underside of the roof uncovered. The occupant simply places a coat or two of paint on the underside of the roof structure and calls it a ceiling. This practice leaves all the HVAC ductwork and structural steel exposed. The problems this practice poses are many. One of the biggest problems is that the exposed insulation and wrapping on the HVAC ducts burns away quickly leaving a slinky like death trap for advancing firefighters. The photo on the left shows the ductwork in place and the photo on the right shows the ductwork up close.

A final few notes on building construction:

- Considerable consideration must be given to how the building was put together. It will come apart in about the same way when attack by fire.
- Things are not always as they seem. (see the veneer picture below)
- On occasion a cellar can be found but usually only in older structures. Most modern structures are on a concrete pad.
- Next year this information might be obsolete. Things are changing everyday.

Access

Front Access

Access in the front is typically metal frame door with tempered glass in door and in the glass panels immediately adjacent to the door. The rest of the window structures tend to be plate glass. Use extreme caution when breaking glass. Walking on tempered glass is like walking on ice with sneakers and plate glass breaks into large, sharp, and dangerous shards.

Typical front door

Typical rear door

Rear Access

Expect rear doors to be outward opening, heavily secured and sometimes with extreme measures including bars and four point locks. We will talk later about forcible entry considerations for these doors.

Fire Separation

Fire separation between individual occupancies is accomplished in many different ways if it is done at all. The separation may be concrete block or, as has been seen recently double sheets of 5/8" dry wall. The implications here go beyond fire travel as block and double sheets of drywall are impediments to wall breaching for egress as well.

Fire Protection

Older structures may not have sprinkler protection. Even with sprinkler protection potential exists to quickly overwhelm the system. The fire department should ensure that fire department connections are supported if they are available.

Utilities

Utilities are usually grouped in rear. It is also possible to find HVAC controls and other utility controls in the space between the ceiling and the roof level. Some strip malls have a common rear corridor where these utilities are located. Either way they tend to be grouped together and in the rear.

Drop Ceilings

Drop ceilings are a low cost way of improving the aesthetics of a workspace. They are so cheap in fact that it is usually easier and cheaper to hang a new drop ceiling under an existing one than replace the initial ceiling outright. In buildings that have seen multiple renovations it is not uncommon to find multiple drop ceilings.

The danger with drop ceilings is two-fold. One, they do a great job of hiding fire and smoke for extended periods of time allowing fires to grow unchecked in the ceiling void. Many times when the fire department arrives they are faced with a light lazy smoke condition and no heat. It is not until the fire finally breaks out of the compartment that the true magnitude of the problem is realized. Two, many engine crews have reported that they had the fire knocked while command was staring at flames 40 feet into the sky. The fire was in between drop ceilings.

It is crucial for fire department personnel investigating odors of smoke in strip malls to gain immediate access to the overhead space, ensuring that they get past all ceilings present. Your life depends on it.

Renovations

Renovations are common as strip malls change occupancies over the years. You may find multiple drop ceilings, to rear doors that no longer access the interior, HVAC or other live loads added to the roof, multiple occupancies grouped into one or one occupancy sub divided, just to name a few.

It is crucial that fire department personnel be familiar with the types and construction features of all building in their response district.

Fire Spread

Rapid fire spread is likely as fire and heat travel through open channels between occupancies, or conduct heat via the structural steel exposed in the plenum. Fire can spread rapidly in the front overhang area where typically you can find electrical, and sometimes plumbing lines in a non-fire stopped open space that is common to all the occupancies on the row. The electrical feed for the front signage is housed in the overhang. Extension and fire spread along the rear is not typically a problem, unless of course, the fire accesses the cockloft void.

Smoke spread is predictable; it will be everywhere.

[For more information on strip mall construction and building construction in general see Francis Brannigan.]

Size Up

Size-up is one of the most crucial and often the most overlooked functions on the fire ground. The first arriving units on the fire ground dictate the pace and nature of the entire operation and in order to do this good information must be had.

The size of the strip mall usually precludes the first arriving officer from doing a complete walk around. It becomes incumbent on units assigned to the rear to give a good size-up report from the rear.

Pre-planning

As with any fire size up begins long before the first unit arrives on the scene. Size-up begins with good pre-planning and by paying careful attention to all available dispatch information.

Good pre-planning identifies:

- Available water supply
- Building construction features
- Recent renovations
- Location and type of suppression and detection systems
- Occupancy type and fuel loads
- Location and type of fire walls
- Location and type of forcible entry/egress problems
- Location and type of utilities
- Special or complex situations

Once on the scene make note of:

- Status of water supply
- Available personnel
- Lag time for additional apparatus and personnel support
- Burn time of fire
- State of fire advancement
- Ongoing renovation
- Location of parapet walls
- Fire in exposed overhead areas especially the front awning/overhang
- Evidence of fire travel into exposure buildings

Fire Volume/Fire Flow

Strip mall fires have the potential to generate a significant number of BTUs requiring a significant fire flow to absorb those BTUs. In other words, big fires require big water. Companies with strip malls in their response district must be proficient in generating large fire flows quickly. The determination of needed fire flow and how those resources can be developed are the topic for another lesson.

Below are some examples of commonly accepted methods for determining required fire flow and some internet resources you can use to develop your knowledge base further:

Accepted Formulas

Iowa Formula- L(W)(H)/100= GPM

National Fire Academy Formula- (L)(W)/3=GPM

Additional Resources

www.gotbigwater.com
www.firetactics.com (type fire flow into the search field)
www.isomitigation.com (click on needed fire flow link in left hand navigation bar)

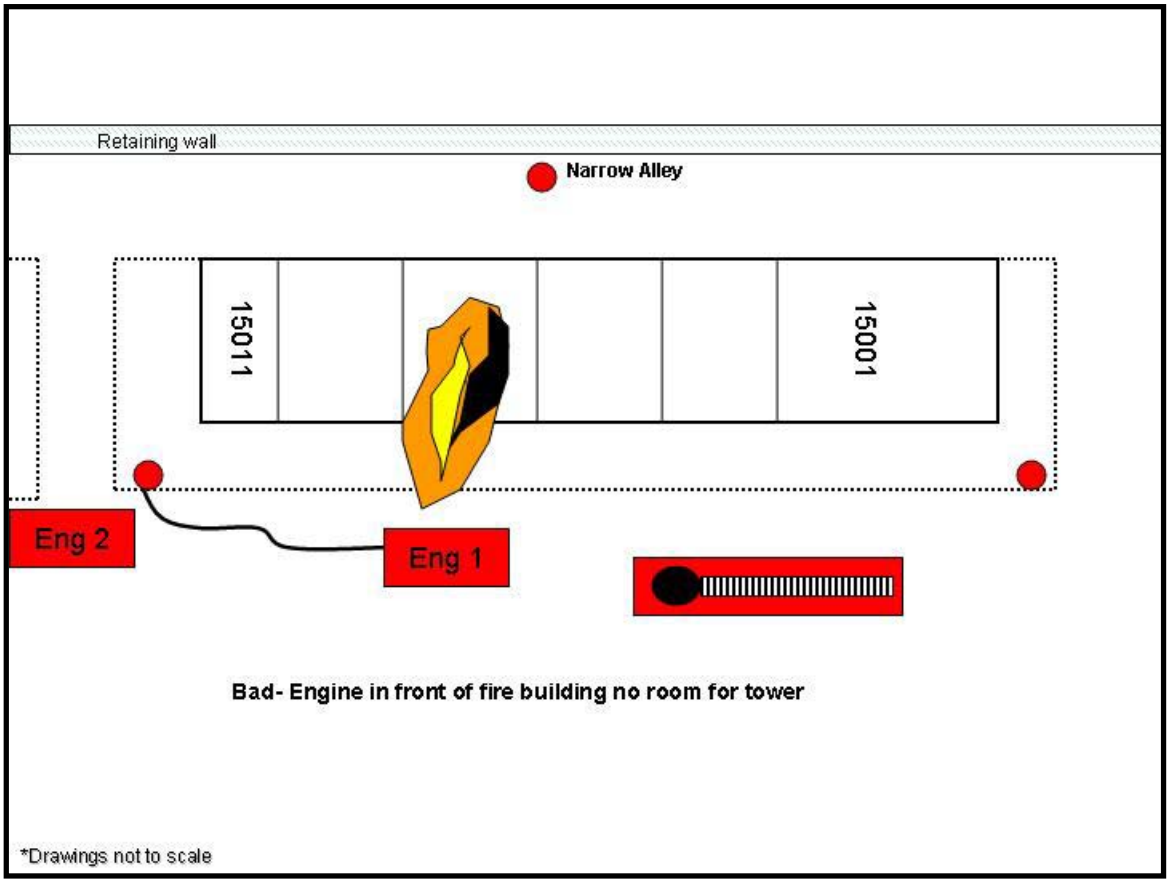
Apparatus Placement

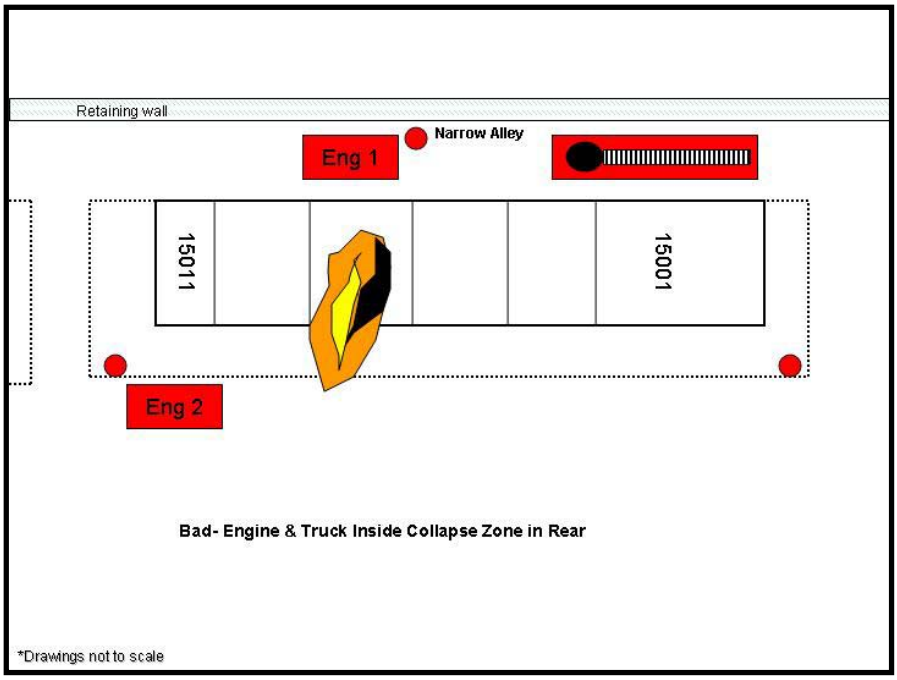
Apparatus should park in anticipation of the building coming down. To that end units should not be right up against the building. Obviously engines need to leave room for the ladder companies as well. When arriving at an advanced fire that will lead to master stream operations it is important to leave sufficient room for tower ladders to extend their buckets to ground level. The distance needs for tower ladders vary by the maker and model of the unit but a good rule is to park the unit about 60' from the building. This allows the operator to put the basket on the ground in front of the occupancy and sweep the front of the fire with its powerful master streams.

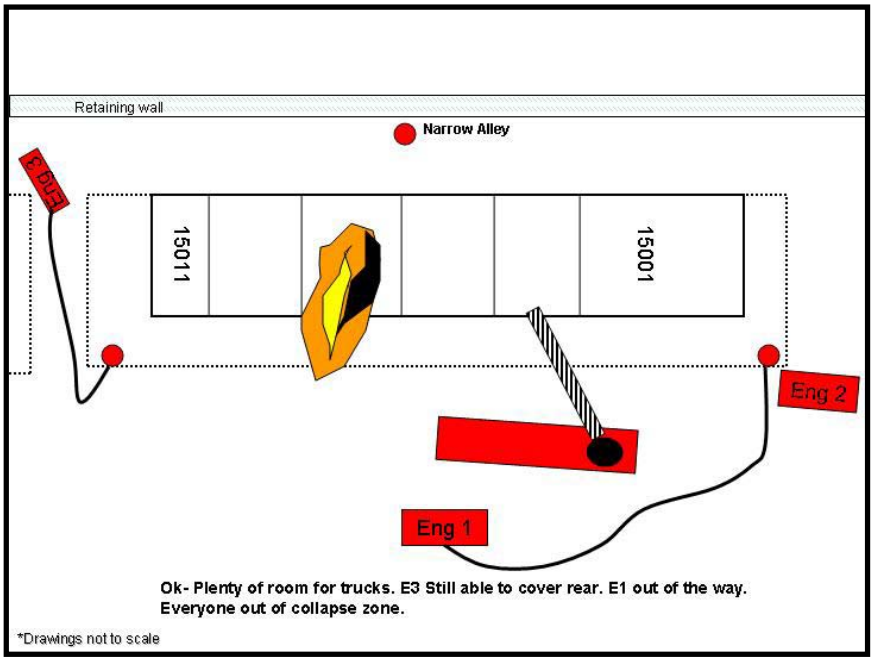
A quick word to engine company crews: Just because the fire hydrant is right in front of the building does not mean you should use it. The closest hydrant is not always the best hydrant.

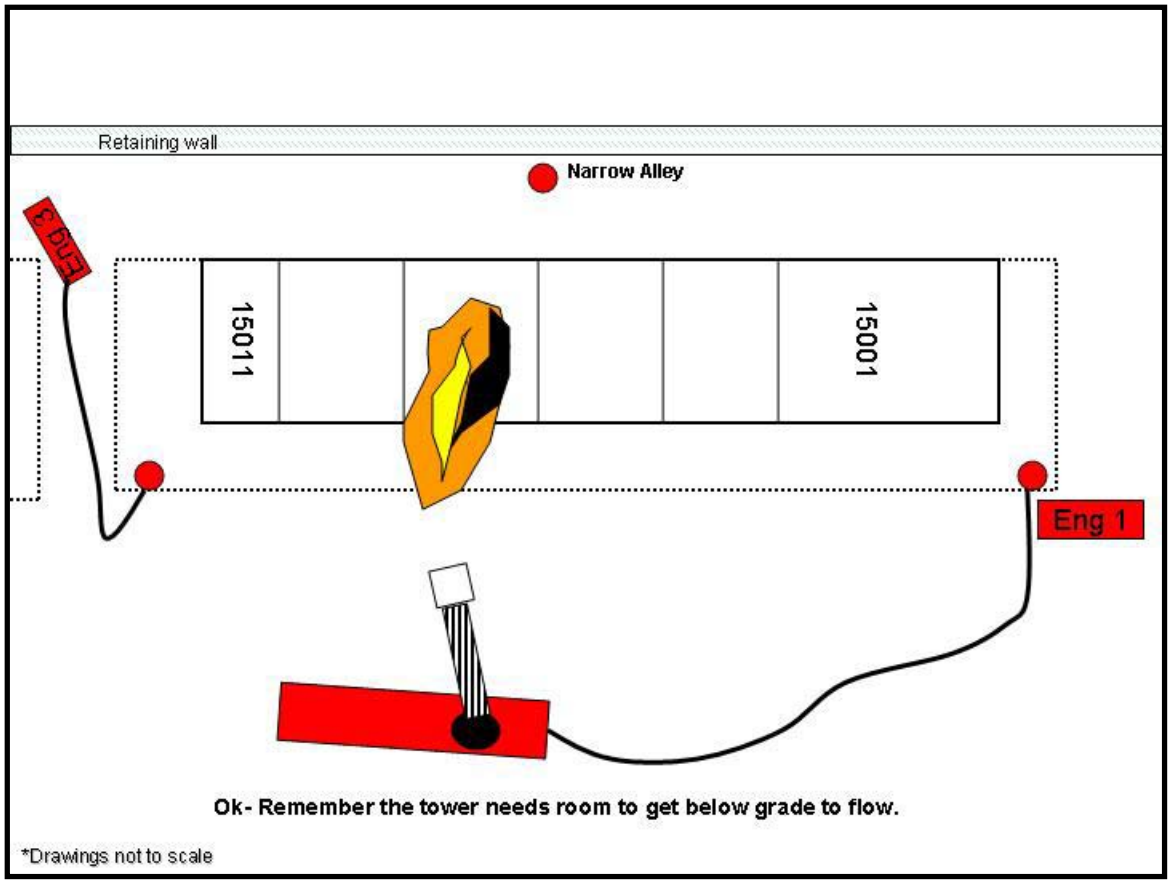
Stay out of the collapse zone. The collapse zone is 1 ½ times the building's height including the parapet. Bricks fly and they hurt when they hit you.

The diagrams below highlight some do's and don't of apparatus placement at strip mall fires:




Retaining wall
Narrow Alley
Eng 1
15011
15001
Eng 2
Bad- Engine & Truck Inside Collapse Zone in Rear
*Drawings not to scale

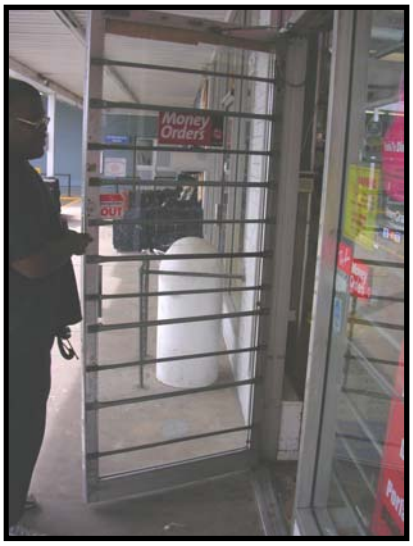

Retaining wall
Narrow Alley
E3
15011
15001
Eng 2
Eng 1
Ok- Plenty of room for trucks. E3 Still able to cover rear. E1 out of the way.
Everyone out of collapse zone.
*Drawings not to scale


Retaining wall
Narrow Alley
ENG 3
15011
15001
Eng 1
Ok- Remember the tower needs room to get below grade to flow.
*Drawings not to scale

Forcible Entry

Forcible entry at the strip mall on the front is pretty easy. The worst-case scenario is to break the glass out of the door. By simply striking the tempered glass in the corner with a sharp blow you can spider the glass and push it easily out of the way. Forcing entry in the rear is a more difficult task as rear doors tend to be more heavily secured.

As easy as it seems our times have forced many business owners to find new ways to prevent the easy entry that large glass windows present. A few examples are illustrated below. The key point to remember here is to never open just enough of the bars or gate to make entry. Continue to take the entire gate down. What was an easy entry on arrival may be a bottleneck if you are forced to retreat from a quickly advancing fire.



Home made bars on an entry door

commercial gate on front door

Power saw in rear

A power saw with a metal blade works well to cut through rear doors. You can either cut out the lock with a triangle cut or if there is enough of a gap between the door and the jamb you can saw straight down in between the two. See pictures below.

When making the triangular cut you only need to make two cuts with the saw. You must ensure that you have enough blade to cut through the whole door. Once the cuts are made you simply use your hand tool to pull the lock mechanism out.

Note the gap between the door and the jamb. Inserting the saw blade and cutting the lock bolt is an easy method to gain entry.

Cutting hinges

Yet another forcible entry method is to cut the hinges off of the door and then pry it open. This is not my favorite choice, it takes a little more time than attacking the lock but it works.

Bars/roll up gates/and roll up doors

As discussed earlier more and more bars and protective gates are finding their way into strip mall windows and doors. In most cases the bars will be found inside the windows. You will have to take the glass out and then cut the bars or gate. You should resist the temptation to make a cut only big enough to fit through. Remember, the hole that you fit through easily on entry can be an egress hazard

when fire conditions deteriorate rapidly.

The top photo shows a homemade security device and the bottom shows a commercially installed metal roll down gate. There are many theories on how to deal with these hazards. Make a hole in the gate big enough to fit into and out of. There are ways to roll these doors up but then you have to worry about them falling down. You should also be concerned with the door housing being exposed to heat and released from the door.

Other Means of Entry

If the building is on fire the fire department obviously not worry about windows and locks. However, there are times when forcing entry needs to be and can be less destructive. For example if the fire is at the far end of the mall and we are gaining access to a store on the opposite side of the row perhaps we can take the time to be less destructive.

Some general rules follow:

- The doorframe tends to cost more than the door glass.
- The lock is cheaper than both the door and the glass (go through the lock when you can)
- Using a bar to pry the door is a sure way to ruin the door.
- A commercial auto-lock out kit is great to reach between double doors and activate panic hardware. (I have entered many buildings this way.)
- A power saw or reciprocating saw can cut the lock lever if there is enough sufficient space between the doors.
- Vise grips locked onto the lock cylinder and twisted remove locks with ease.
- A large pipe wrench with a breaker bar is a sure bet for hockey puck locks and padlocks.
- A sharp blow with the haligan bar to the lock cylinder will shear it off, allowing you to punch out the lock's insides and gain entry. (This method may tear up the door if you are not careful.
- After taking the glass on the door you must remove the bar on the inside of the door. A hard blow with the haligan usually does the trick.
- New locks are designed to resist the K-tool and the R-tool, their use is becoming limited quickly.
- This is no time for the hydra-ram. I you spread the door apart you might as well have taken the glass out, glass is cheaper and faster remember.

- You may have some luck popping the hinges out of a rear door. It is typically hard to get good access to the pins to get them out. If you are fighting time don't fight the hinge pins too; cut them. (The pins are not usually popped out and easy to get to like the in the picture.)
- Fire damage costs more than everything on this list. (When in doubt take it out.)

Ventilation

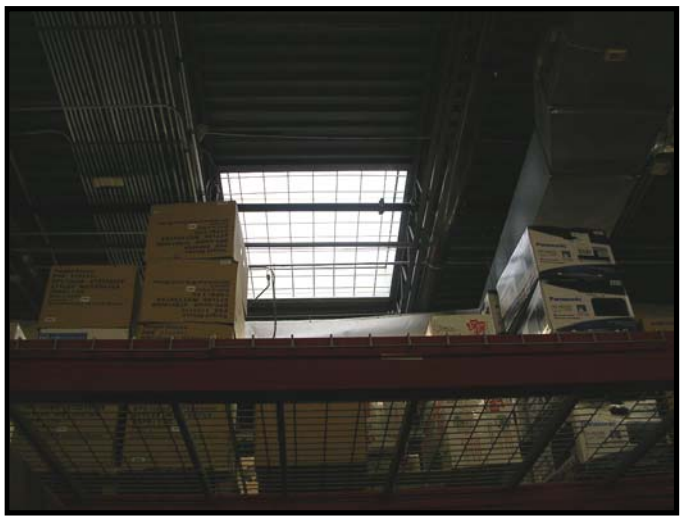
General

Comprehensive ventilation is one of the major facets of fire fighter safety. By releasing the heat, smoke, and toxic by-products of combustion from the building the fire department makes it easy, faster, and safer to conduct interior attack operations.

When a building is on fire the fire department should not hesitate to aggressively ventilate the structure. Of course this ventilation should occur in coordination with the fire attack.

There are two main ways of ventilating the strip mall: horizontally and vertically. I hesitate to send people to the roofs of these buildings, especially after the earlier discussion of their construction features. Another major difference between the two ventilation options is their use of tools and manpower. To safely ventilate from the top you need at least two firefighters, who must have already established two ways off of the roof, are carrying a power saw and other tools, and are wearing their full compliment of protective clothing including SCBA. The firefighters operating on the roof may have to remove multiple layers of roofing material and without a doubt they will expend a great deal of energy.

Conversely that same two-person team on the ground can use one person to break all the front glass while the second person forces the rear door with a power saw. No one is working inside an IDLH and the entire vertical ventilation operation can be done in remarkably less time than vertical ventilation and with diminished risk.



If a team is dedicated to roof operations they should concentrate on quickly venting through existing openings, roof scuttles, skylights, exhaust fans, etc. and then quickly getting off of the roof.

For the record a trench cut takes up a lot of time and a lot of tools and a lot of manpower. Trench cuts should be used as a proactive measure and not a reactionary measure. In other words for a trench cut to work you have to get way ahead of the fire. You also need the fire to be extending at a slow enough rate to allow the cut to be finished ahead of the fire's arrival.

There are other holding operations that are just as effective as the trench cut and can be completed with less manpower in less time.

Roof Safety

The roof of a strip mall is an inherently unsafe place and should be avoided. However, if the incident commander orders crews to the roof there are ways to make the operation safer:

- Do not jump onto the roof. Probe it first then step onto it.
- If possible enter from the rear, the access is usually only one story in the rear and has no parapet wall.
- Before stepping onto the roof make a kerf cut at the edge, while you are still on the ladder. If fire or heavy smoke under heavy pressure comes out of the hole cancel the roof job.
- Keep three of four ladder rungs over the roof edge so you can see it.
- Before stepping onto the roof ensure that you have at least two ways off of the roof and that all members entering the roof are aware of the planned egress points.
- Take more than one saw with you.
- Ensure that all members are wearing all of their PPE and at least one member is radio equipped.
- Save trips up and down the ladder by deploying a utility line over the roof edge.
- Identify the direction and location of the roof supports and walk along them if possible.
- Do not vent between yourself and your exit point. (This seems like a no-brainer but you would not believe some things I have seen out there)
- Save saw blades by removing the rubber coating of the roof before sawing. (This is time consuming. It requires that you remove the ballast with a shovel, cut the rubber with a sharp razor or carpet knife, peel the rubber back with hooks, and then make the cuts in the metal deck. The other option is to plunge your saw blade into the composite roof, cut for a few feet, and the replace the saw blade.)

When operating on the roof beware of the following signs to get off of the roof:

- Rapid deterioration in fire conditions below
- Units operating on the interior are not making progress
- The fire vents itself through the roof
- Heavy smoke venting under pressure
- Loss of visibility
- Melting snow or tar
- Soft spots or sagging portions of roof (note that many corrugated roofs feel “saggy” when they are not on fire, this does not mean that you should accept saggy when there is a fire beneath them
- Any movement of any of the roof top appliances, HVAC units, etc.

Choosing and Advancing Hand lines

The determination of which hand line to deploy is a function of a few factors:

- Pre-planning
- Initial size-up
- Available water supply
- Available manpower
- Flow capabilities of available hand lines

Pre-planning allows you to know how the building is laid out, whether there are cubicles, bars, or other turns to navigate. Pre-planning also helps you plan for where the fire might be going instead of where it is, like in the case of a small fire in the rear of occupancy with flammable storage in the rear. In this case you might choose a larger line to counter the possibility of the rear reaching the flammables.

Your initial size-up will let you know where the fire is and will give you an idea of how much of a head start the fire has on your operations. If an error must be made let it be an error of over estimation. Do not take a knife to a gunfight. Better to take the 2" line and only need a 125 GPM fire flow than to take the 150 GPM line for a 250 GPM fire.

Most fire officers rely on their judgment and a quick "eyeball" of the building to choose their line. While fire flow formulas are nice and are scientifically valid they are developed under controlled circumstances and cannot take into account all of the variables of the fire ground. Discretion and experience are the primary factors at work here. Some fire departments mandate that crews take a 2" line with a 1" tip as the initial attack line on all strip mall incidents.

The best rule of thumb is that the fire continues to grow until you put water on it. Do not choose the line you need for what is showing when you arrive, pull the one you will need by the time you get the line into place and flowing on the fire.

When speaking of two or three person engine companies it is worthy to note that while a 2 ½" line may be the theoretical best choice it is near impossible to maneuver a line of that size with a two-person line crew once the line is charged. If you have to make numerous corners great energy will be expended and the line might never make it to the fire.

You must flow test your lines to know how much they can flow. One fire company just outside Washington, D.C. uses a pre-connected 250' 2" line with 1, 1 1/8" , and 1 ¼" tips. They flow tested this line and found that with the hose they carried on that line and the nozzle they were using they could get 265 GPM (1-1/8" tip). The line is much harder to handle at this flow rate but is still moveable for a two-person line crew.

If you should choose the 2 ½" line consider pairing engine companies up to get the manpower you need to move the line about the occupancy.

One serious consideration though is that if you feel the need to advance a 2 ½" line into a building for fire attack, especially given the construction features of a strip mall, you are more than likely operating in a dangerous zone. If you need that kind of flow you might be better served by placing a master stream in service to quickly darken the fire and cool the steel before moving in with a hand line. The blitz attack and other attack options are discussed later.

Using and 1 ¾" line is not necessarily a bad thing. It moves much more quickly through a fire allowing you to access the seat of the fire quickly. The 1 ¾" line still has a very effective reach and with a 7/8" slug tip may give you nearly 180 GPM, a respectable flow rate.

Advancing the Hand line

To stretch a hose line well requires much practice before the fire even begins. Many people complain when it is time for yet another hose line drill. The only way to get it right is by constant practice.

With a short line crew, two or three persons, you will find great difficulty making corners and maneuvering around obstacles. Take the time to lay the line out on the sidewalk in front of the fire building. Avoid having to drag couplings around the front door by laying the line out perpendicular to the entry door. No matter how well you flake out the line there will be kinks and couplings will get stuck on corners. Think about using your engine driver to help advance the line trough the threshold of the door once they have set up the pumping operation. You can also use other crews to assist you with moving the line. The time you save flaking out dry hose will be made up many times over once you make your initial entry into the structure.

After you make entry, use your hose line to gain access to the overhead by sweeping across the top of the occupancy beginning at the front door. This accomplishes two things:

- It exposes hidden fire
- It allows you to get cooling water on the steel

Continue to sweep across the ceiling at regular intervals but always before you advance.

Once on the hose line and inside the structure you might need to go back for more hose. Know who is going to go back for more line before you even leave the station. We are supposed to work in pairs but reality dictates that someone has to go back for more line. Base your decision as to who goes or who stays with the nozzle on the experience of your crew.

In no case should you make entry into an advanced fire prior to the initiation of ventilation. Remember if the rear door is open and the front glass is in place the fire and smoke have to move over your crew to escape to the outside.

The First Line

"As the first line goes, so goes the fire." I don't know who said it but it is true.

In most cases where the fire can be controlled by fire department hand line it is controlled by the first line in. Vincent Dunn says on his website that you don't have a back-up line until the first line is in place. This makes sense. All crews operating on the fire ground should be operating to get the first line into place and working before attempting to get the back-up line in place.

The Second Line

The second line is there primarily for the protection of the first line, not to run past them and get to the fire first. The crew advancing the second line should seek to:

- Ensure the first line is in place
- Protect the egress/flank of the first line
- Control extension
- Be prepared to assist the first line with the initial fire

Which objective is met first depends on the situation the crews are faced with. Most importantly it is vital that the second line work to protect the first line. Good placement of the second line goes a long way towards preventing Mayday transmissions.

Additional Lines

Even though engines and trucks should be assigned to cover the rear of strip malls when they are on fire this does not mean that they need to necessarily make entry to the fire occupancy from the rear. The units assigned to the rear are typically the later arriving companies and the lines they stretch will primarily be used for exposure protection.

The pictures show a view first from the outside and second from the inside of a store to what used to be an exit door. The door was welded shut from the inside, framed and dry-walled over. Crews attempting to force entry from the rear had one heck of a time trying to get the door open. Now they know why.

It is not always a bad practice to advance lines from the rear to protect the exposures but great caution must be exercised. As stated earlier strip mall occupancies change all the time. Each new tenant makes the renovations necessary to accommodate their business. What happens sometimes is that the door you force in the rear may not lead to the exposure occupancy you are trying to access but instead to the rear of the fire occupancy. Just looking at the numbers on the back of the door is not enough.

If there is any doubt about what door leads to where secure a line from the front and make your access from there. Units operating exposure lines not immediately adjacent to the fire occupancy have less to worry about.

Additional lines to the fire occupancy (above the first two lines) should not be advanced through the same entry point used by the first two lines. The practice of running three or four lines through the same access point is confusing at best and creates an impediment to advancing any of the lines.

Search and Rescue/Utility Control

Search and Rescue

Search and rescue should always be a part of the fire ground thought process. We discussed situations earlier where occupancies you would not expect to be inhabited after hours house illegal living quarters. Just because we always consider search operations does not mean that they should always be the first priority on the list.

The unit(s) responsible for conducting the search should use a good risk-benefit analysis and attempt to search under the protection of a charged hand line at all times. Remember when searching that it is very easy to get lost in a building of this size. Make every effort to stay in contact with the engine companies, as the hose line will provide you direction to the egress. If searching in areas remote from the fire but filled with smoke consider wide area search, tag line search or ventilation procedures.

In the presence of a working fire when you have a low-manpower situation you can save more lives and property with good ventilation and adequate fire attack than you can by racing in ahead of the hose line to "search."

Utility Control

Luckily for the fire department most of the utility valves and shut-offs for most strip mall will be grouped together in the rear. Use caution when accessing the rear to control utilities to be cognizant of the collapse danger and you proximity to the building.

While most of the utilities are group together in the rear of the store it is not uncommon to find shut-offs and controls inside the occupancy in the ceiling area. This practice, of course, makes it tougher for the utility person to get to them.

Anticipate where the fire is going and shut-off all of the valves. This allows you to isolate the affected units, possibly before they are even affected.

Strategy & Tactics

Strategic Framework

The underlying strategic framework for all fire is essentially the same; provide for life safety, incident stabilization and property conservation in that order. A fire occurring in a strip mall does not affect the overarching framework.

Unit officers and incident commanders must always keep in mind that modern construction techniques make tearing down and re-building a strip mall heavily damaged by fire a better alternative to repairing. Those very same construction features are what make fighting fires in these buildings extremely dangerous.

Firefighters are essentially fighting fires in large open compartments with exposed structural steel; buildings that almost want to fall down when attacked by fire. When considering a strategic approach remember that life safety is for fire department personnel as well.

It is not necessarily the best thing to do to conduct exterior only attacks on all of these buildings. The incident priority framework also includes property conservation. It is the imperative of unit officers and incident commanders to understand and practice good risk management procedures and to constantly re-evaluate the tactics in use.

The following tactical alternatives are approached that have worked in the past. However, the biggest decision when faced with a strip mall fire is whether or not to commit crews to an interior attack. This is not a decision to take lightly.

Tactical Approaches

The Frontal Attack

The frontal attack is the basic through the front door with a hand line approach. Critical to making this approach work is a good understanding of required fire flow. Units advancing through the front must bring a line capable of sufficient fire flow. The first line must make access to overhead voids as they progress. The hose stream is a great tool in removing suspended ceilings. Once the overhead is exposed the stream should be first used to cool the structural steel before progressing to the fire.

Good forcible entry and ventilation work will improve this process but clearing heat and smoke, allowing the line crew to advance quickly. The second line into the structure should protect the first and ensure that the overhead cooling is continued. Going through the front door to get it.

Forcible entry should concentrate on gaining access to and opening rear doors providing and exhaust point for heat, smoke and steam. Ventilation efforts should concentrate first on horizontal methods and then vertical methods. Horizontal ventilation requires less manpower. When vertical ventilation is attempted crews should minimize the time spent

on the roof and should seek out pre-existing openings. Cutting holes in commercial roofs is manpower intensive, dangerous, and time-consuming; it should be avoided.

The Flanking Attack

A flanking attack is used when there is heavy fire in the initial occupancy. Crews move heavy lines into adjacent occupancies, breach walls and flow water into the original compartment. In order for this to work the original occupancy's compartmentation should be left intact. That means the front door and front windows are not taken out.

The idea is to flow water into the compartment allowing the steam to suppress the fire much like when fighting fires on ships. Of course this approach is tricky as crews leave the fire to build for as long as it takes to stretch lines, force entry and then breach a wall from the exposure into the fire building. In low manpower situations or when forcible entry crews are delayed this option may allow the fire too much time to burn unchecked; increasing the risk to all.

This tactic requires speed in both breaching and line advancement. Any delays should be a good indication that it is time to switch tactics.

The Combined Attack

When the risk- benefit analysis determines that the fire is within the ability of the fire department to control it from the interior but beyond the ability of a typical hand line (1 3/4" or less), a combined attack may be used. This attack method involves advancing a large line with high flow capabilities, i.e., 2" line with 1" or 1 1/8" tip, into the building. This line will be hard to maneuver in low manpower situations but in this scenario it is not designed to move much.

The first crew moves into the building far enough to allow other crews to advance past them and then initiates a combined cooling and holding pattern. This line operates initially into the overhead, cooling steel, and can also take advantage of the reach of the stream to operate into the fire, hopefully darkening it down for the second line.

The second line advances just after the first line, it is of a smaller, easier to maneuver diameter and flow. Operating under the protection of the first line the second line moves in to attack the bulk of the fire. If the first line cannot extinguish the fire command must decide if a third line is required or if it is time to back the troops out and conduct an exterior attack.

Critical to making this work are some key points.

1. The second line has to be ready to move in immediately after the first.
2. The first line must only operate into the overhead once the second line reaches their position.
3. The first line must always know where the second line is.
4. Once the second line is advanced beyond the first line the first line becomes the back-up line.

5. This attack has to be coordinated with ventilation and forcible entry, meaning multiple crews are needed before the attack begins.

The combined attack also requires crews available to move into exposures quickly to control extension.

The Blitz Attack

For the small department with limited manpower faced with heavy fire in a strip mall the Blitz attack is probably the best option. The blitz attack involves operating the wagon pipe into the building as the first attack, hopefully knocking down the bulk of the fire, and then advancing hand lines to the interior for "mop-up."

The blitz attack relies on:

- The large flow rate available from the wagon pipe (typically 500 GPM) to achieve a quick knockdown.
- Getting the stream into position quickly (typically a pre-piped waterway to the wagon pipe and operating on tank water.)
- Crew-safety is maintained while the fire is large.
- Exposure property is protected by a quick knock down on the original fire.

A blitz attack can be quickly employed with tank water and a two-person crew making it an ideal choice for low manpower situations or when help is far-off.

This attack hinges on getting water to bounce off of ceiling and walls breaking up the stream into heat absorbing droplets. Simply flowing the wagon pipe into the front of the store and out of the back is ineffective and a waste. The size height of modern apparatus forces a modification of the blitz attack. In the modified blitz the crew sets up a portable monitor in front of the fire building and uses it to achieve the knock down. This modification can still be done with a two-person crew. One of the benefits of conducting the blitz attack this way is that you can get a better angle for breaking the stream up on the ceiling and walls.

A blitz attack that does not lead to a quick knockdown of visible fire leads quickly to a defensive operation. A simple guideline is that if one tank of water does not achieve knockdown, the next tactic is defensive operations. (this assumes a booster tank size of between 500 and 1000 gallons.)

**Recent training evolutions have demonstrated that it takes two well-trained people working with a deck-mounted master stream, that they have to take off of the engine, place on a base and run hoses to, about 90 seconds to get water flowing. Having a pre-connected heavy flow device allows one person to deploy the line in less than half that time.*

Defensive Only Master Stream/Heavy Duty Operations

Defensive operations mean that we have "written the building off." Our risk-benefit analysis has revealed that either other tactics would be ineffective or that the risk of conducting the operation differently outweighs the gains.

When conducting a defensive attack the objective shifts from the fire to ensuring that no one gets hurt for a building we have "written off." All operations should be conducted from outside the collapse zone, and more importantly, crews should not be sent in afterwards to mop up or perform overhaul.

The decision to "go defensive" means that the building is unsafe for humans. The addition of millions of gallons of water does not make it any safer.

When possible, tower ladders are preferable to straight trucks in this attack mode. The tower ladder has much more versatility, can change positions quickly when needed, and is much faster to set up. Perhaps the greatest advantage of the tower ladder is its ability to flow from below grade, getting the water to where it will be best used. Too many times you see streams from ladder pipes rolling ineffectively off of roofs while wagon pipes and towers sit idle.

The Need for Standard Operating Procedures

SOPs bring a new level of order and control to fire ground operations. I like to think of SOPs as a playbook of sorts. If everyone is aware of what everyone else is supposed to do while remaining focused on their own role the chances that a critical task will be missed are lessened.

SOPs should take into account the prevailing manpower situation, the available water supply, and the time lapse between when the first crew arrives and when the rest of the help arrives. It is crucial that all members and all departments that might run mutual aid are aware of the SOPs and have agreed to follow them.

Of course SOPs are not the end all be all answer to fire suppression and they are certainly not designed to interfere with the autonomy of the Incident Commander. The SOPs are designed to ensure that all critical functions are met in a prescribed order. With SOPs we take the guesswork out of how we are going to behave on the fire ground.

SOPs cannot cover all contingencies but can provide a theoretical and practical framework for dealing with all contingencies. SOPs also prove useful when a firefighter becomes lost or is found to be missing. If the Incident Commander knows where the firefighter should have been the search can start there and save valuable time.

If the fires are going to go out, and as much property saved as possible we cannot afford to make up the game plan as we go along. The fire department must be prepared. Some sample SOPs for strip mall fires are attached.

For departments operating primarily with home response or on-call personnel SOPs will help to prioritize which tasks and tactics will be used until full staffing is reached. The SOPs need not be complicated, they just need to be thought out and followed. If you have them, know them, if you don't have them, then get them fast.

Other Considerations

Thermal Imaging

Thermal imaging is remarkable technology and in the hands of a firefighter who understands how the technology works many more lives and properties can be saved. The key is getting the training to go with the thermal imager.

What the thermal imager can do for you in the strip mall:

- Help to identify the relative heat release of the structural steel. If all the trusses are the same color as the roof and the room, you know that the trusses have absorbed a great deal of heat and must be cooled quickly if interior attack is to continue.
- Helps to speed searches. In occupancies with long aisles a search crew with an imager can scan aisles using the imager to identify objects requiring manual investigation. While the imager is not a replacement for a manual search it can certainly speed the process.
- Helps locate the fire. Sometimes the smoke is such that easy identification of the fire's location is just not possible. Using the thermal imager crews can more quickly determine just where the fire is.
- Helps to locate alternate egress points. These occupancies are all arranged differently. The imager can help you find that window or door that will be your way out is conditions deteriorate.

The other uses of the thermal imager are limited only by your knowledge of the technology and the machine you are using. Just remember that the thermal imager has its draws backs including:

- Loss of depth perception
- Loss of orientation
- Loss of peripheral vision
- Loss of a hand when using it

Firehouse.com in its member's only section has a regular thermal imaging column. It is worth the read. Also numerous classes are available. If you buy a thermal imager you should at least buy the training to go with it.

Rapid Intervention

Rapid intervention is tough stuff made harder by the configuration and fire loads of commercial structures. It is crucial for the RIT to be assigned, to be ready, and to have the tools/equipment they need to make their operation successful. This is not the place to go into too much detail about RIT operations but here are a few key points:

- The size and shape of these buildings may require more than one RIT

- The RIT should have the tools for breaching and breaking the material they are faced with, a carbide blade on the cut-off saw is not what you need when a firefighter is trapped by burglar bars.
- The RIT should do a size-up and that size-up should be on-going
- The RIT should not be sacrificed to run additional lines.
- The RIT should not be disbanded when the tactics go from offensive to defensive.

Command Considerations

Initial Command

You are the unit officer dispatched to a fire in a strip mall. You have a large number of things to consider including:

- What do I know about this building already?
- How many people do I have?
- How long will it take for help to arrive?
- How much water will I need and how long will it take for the water to arrive?
- Can I stop the fire I see quickly, or do I protect exposures first?
- Do I have a two-out/RIT?
- Do I have enough people to run a large line inside or will the blitz attack be better?
- I don't see any fire or smoke, save for a lazy haze inside the building, do I attack what I expect to be a hidden void fire or do I work to evacuate and get lines in the exposures?

This is, of course, just a sampling of the types of questions that need to be asked by the first arriving unit officer, the de facto incident commander. Vincent Dunn's book Commanding Fires and Other Emergencies is an excellent resource in this regard as is the Street Smart Firefighting text.

Formal Command

What makes commanding difficult is that the Chief is rarely the first one on the scene. He or she usually arrives after at least some of the units have committed to a strategy and the tactics to support that strategy. SOPs make the job easier for the Chief as they know at least where crews "should" be, even though they still have to ensure that crews are where they should be. Command has then to decide if the decisions made by the initial units are strategically sound or if they need adjusting.

Having a plan is the key to a good command operation. In Bingham's Street Smart Firefighting Book he provides a pretty good risk/benefit matrix. If you like his use it, if not use another but the incident commander at a strip mall fire has some pretty big decisions to make pretty fast:

- Do I have enough water?
- Do I have enough people?
- Where is this fire headed?

- Can I stop this thing or just hold it in check?
- What happens if I do nothing?
- Should crews be operating inside?
- Should crews be operating on the roof? (Questions one and two are related in that you should not have someone operating on a roof when you feel interior operations are unsafe and should never operate in the interior of a strip mall when the roof is unsafe to be on, if the roof is going to fall it won't fall up!)

Command Structure

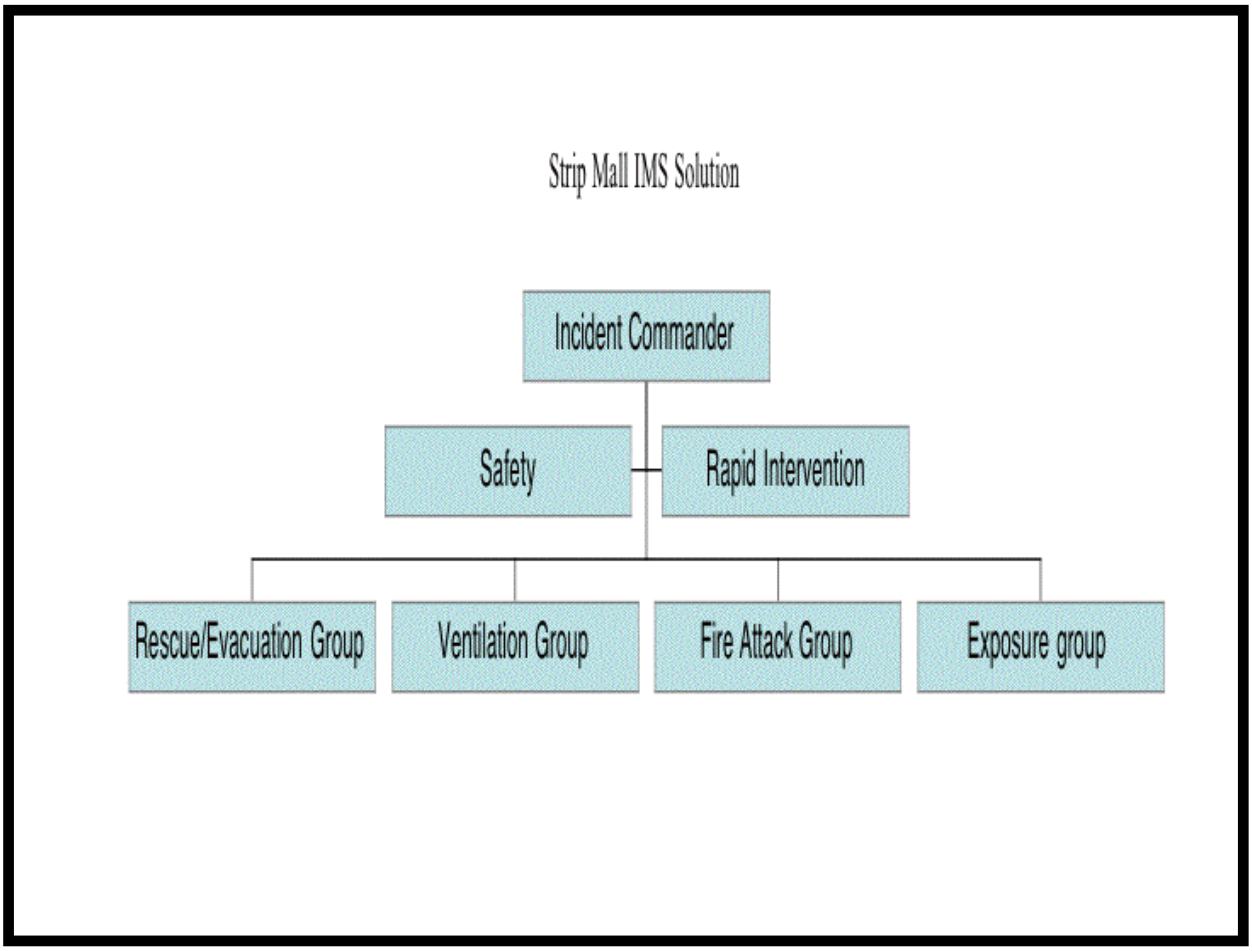
This section was added after the rest of the text. Chief Roger McGary of the Silver Spring, MD Volunteer Fire Department teaches a class on Command and Control of Initial Operations for the National Fire Academy. One of the neat little things I picked up in his class was a three-pronged approach to fire problems. When given a fire scenario you: Ask yourself what the problems are. You then ask what the tactical solutions are to solving these problems. Finally you have to develop an IMS solution that matches the problem you have and the solutions that you have chosen.

Below is an example based on a strip mall with 7 stores and heavy fire in the middle of the row. It is 2 o'clock in the afternoon. People in adjacent stores don't seem to realize that there is a problem.

Problems:
The building is on fire.
There is a rescue/evacuation problem
The fire is likely to extend laterally
I have limited resources

Solutions
Put water on the fire
Rescue/evacuate the people
Put lines in the exposures
Call for additional resources.

IMS Solution



There are, of course other IMS solutions. I lean towards the use of groups as opposed to divisions whenever the situation allows. For more information on the use of IMS to map out fire problems I suggest the NFA class.

Further Reading

Building Construction

Brannigan is the man hands down. Buy the book read it and refer to it often

Command

Vincent Dunn Command and Control of Fires and Other Emergencies
Bingham's Street Smart Firefighting
Smith's Incident Command

Stretching the Hand line
Vincent Dunn's Website
Mutualbox.com
Tinhelmet.com

Water Supply
Gotbigwater.com

SOPs
Montgomery County, MD
Prince George's County, MD
Mutualbox.com

Thermal Imaging
Firehouse.com